We claim:

1. A discharge lamp comprising a ceramic discharge vessel enclosing a discharge space, said discharge vessel including within said discharge space an ionizable material comprising a metal halide, a first and second discharge electrode feedthrough means, and a first and second current conductor connected to said first and second discharge electrode feedthrough means, respectively;

said lamp having a power range of about 150W to about 1000W and exhibiting one or more of a characteristic selected from the group consisting of a CCT (correlated color temperature) of about 3800 to about 4500K, a CRI (color rendering index) of about 70 to about 95, a MPCD (mean perceptible color difference) of about ± 10, and a luminous efficacy up to about 85-95 lumens/watt.

2. A lamp as claimed in Claim 1 retrofit with ballasts and lighting fixtures designed for high pressure sodium or quartz metal halide lamps.

3. A discharge lamp having a power range of about 150W to about 1000W and comprising a ceramic discharge vessel enclosing a discharge space, said discharge vessel including within said discharge space an ionizable material comprising a metal halide, a first and second discharge electrode feedthrough means, and a

first and second current conductor connected to said first and second discharge electrode feedthrough means, respectively;

wherein the ceramic discharge vessel includes an arc tube comprising:

a cylindrical barrel having a central axis and a pair of opposed end walls,

a pair of ceramic end plugs extending from respective end walls along said axis,

a pair of lead-ins extending through respective end plugs, said lead-ins being connected to respective electrodes which are spaced apart in said central barrel,

wherein the electrode feedthrough means each have a lead-in of niobium which is hermetically sealed into the arc tube, a central portion of molybdenum/aluminum cermet, a molybdenum rod portion and a tungsten rod having a winding of tungsten.

4. A lamp as claimed in Claim 3, wherein the arc tube has a molybdenum coil attached to its surface.

5. A lamp as claimed in Claim 4, wherein the discharge space contains an ionizable filling of an inert gas, a mixture of metal halide, and mercury.

6. A lamp as claimed in Claim 5 wherein, said discharge vessel

has a ceramic wall and is closed by a ceramic plug, said electrode feedthrough means including at least one tungsten electrode which is connected to a niobium electric current conductor by means of a leadthrough element which projects into the ceramic plug with a tight fit, is connected thereto in a gastight manner by means of a sealing ceramic and has a part formed from aluminum oxide and molybdenum which forms a cermet at the area of the gastight connection.

7. A lamp as claimed in Claim 5, wherein, said discharge vessel has a ceramic wall and is closed by a ceramic plug, said electrode feedthrough means including at least one tungsten electrode which is connected to a niobium electric current conductor by means of a leadthrough element which projects into the ceramic plug with a tight fit, is connected thereto in a gas-tight manner by means of a sealing ceramic and has a first part formed from aluminum oxide and molybdenum which forms a cermet at the area of the gas-tight connection and a second part which is a metal part and extends from the cermet in the direction of the electrode.

8. A lamp as claimed in Claim 7, wherein the metal part is a molybdenum rod.

9. A lamp as claimed in Claim 5, wherein the arc tube has an aspect ratio (IL/ID) in the range of about 3.3 to about 6.2.

10. A lamp as claimed in Claims 6 and 7, wherein the electrode has a tip extension in the range of about 0.2 to about 1.0mm; the cermet contains at least about 35 wt.% Mo with the remainder being Al_2O_3, and the sealing ceramic flow completely covers the Nb connector.

11. A lamp as claimed in Claim 10, wherein the arc tube and the electrode feedthrough means have the following characteristics for a given lamp power:

Power W	IL mm	ID mm	IL/ID Aspect Ratio,mm	Wall Loading W/cm^2	Wall Thickness mm	Rod Diameter mm	Rod Length mm
150	26-32	5-7	3.3-6.2	20-35	0.8-1.1	0.4-0.6	3-6
200	27-32	6.5-7.5	3.3-6.2	25-30	0.85-1.2	0.4-0.6	4-8
250	28-34	7.5-8.5	3.3-6.2	25-35	0.9-1.3	0.7-1.0	6-10
300	30-36	8-9	3.3-6.2	25-37	0.92-1.4	0.7-1.0	6-10
350	33-40	8.5-10	3.3-6.2	24-40	0.98-1.48	0.7-1.1	6-11
400	36-45	8.5-11	3.3-6.2	22-40	1.0-1.5	0.7-1.1	6-11

12. A lamp as claimed in Claim 11, wherein said metal halide mixture comprises the following salts of 6-25 wt% NaI, 5-6 wt% TlI, 34-37 wt% CaI_2, 11-18 wt% DyI_3, 11-18 wt% HoI_3, and 11-18 wt% TmI_3.

13. A lamp as claimed in Claim 12, wherein the ionizable filling is a mixture of about 99.99% of Xenon and a trace amount of ^{85}Kr radioactive gas.

14. A lamp as claimed in Claim 12, wherein the ionizable filling is a mixture of Argon and/or Krypton, Xenon, and a trace amount of ^{85}Kr radioactive gas.

15. A lamp as claimed in Claim 12, wherein the ionizable filling is Xenon. and/or Krypton.

16. A lamp as claimed in Claim 1, 5, and 13, having a power range of about 150W to about 1000W and nominal voltage of 100V to 260V, and one or more of the following characteristics: a lumen maintenance of >80%, a color temperature shift <200K from 100 to 10,000 hours, and lifetime of about 10,000 to about 25,000 hours.

17. A design space of parameters for the design and construction of a discharge lamp having a power range of about 150W to about 1000W and comprising a ceramic discharge vessel enclosing a discharge space, said discharge vessel including within said discharge space an ionizable material comprising a metal halide mixture, a first and second discharge electrode feedthrough means, and a first and second current conductor connected to said first and second discharge electrode feedthrough means, respectively;

said design space including at least one of the following parameters :

(i) the arc tube length, diameter and wall thickness limits of said discharge lamp correlated to and expressed as functions of lamp power, and/or color temperature, and/or lamp voltage; and

(ii) the electrode feedthrough structure limits used to conduct electrical currents with minimized thermal stress on the arc tube correlated to and expressed as a function of lamp current.

18. A design space as claimed in Claim 17, wherein said parameters also include:

(i) a general aspect ratio of the inner length (IL) to the inner diameter (ID) of the arc tube body is higher than that of ceramic metal halide lamps having a power of less than about 150W;

(ii) the upper and lower limits of electrode rod diameter correlated to and expressed as a function of lamp current; and

(iii) a composition range of the salts correlated to color temperature and lamp voltage.

19. A design space as claimed in Claim 18, wherein said design parameters include the following characteristics for the design of an arc tube and electrode feedthrough means for a given lamp power:

Power W	IL mm	ID mm	IL/ID Aspect Ratio,mm	Wall Loading W/cm^2	Wall Thickness mm	Rod Diameter mm	Rod Length mm
150	26-32	5-7	3.3-6.2	20-35	0.8-1.1	0.4-0.6	3-6
200	27-32	6.5-7.5	3.3-6.2	25-30	0.85-1.2	0.4-0.6	4-8
250	28-34	7.5-8.5	3.3-6.2	25-35	0.9-1.3	0.7-1.0	6-10
300	30-36	8-9	3.3-6.2	25-37	0.92-1.4	0.7-1.0	6-10
350	33-40	8.5-10	3.3-6.2	24-40	0.98-1.48	0.7-1.1	6-11
400	36-45	8.5-11	3.3-6.2	22-40	1.0-1.5	0.7-1.1	6-11

20. A method for the design and construction of a discharge lamp having a power range of about 150W to about 1000W and comprising a ceramic discharge vessel enclosing a discharge space, said discharge vessel including within said discharge space an ionizable material comprising a metal halide mixture, a first and second discharge electrode feedthrough means, and a first and second current conductor connected to said first and second discharge electrode feedthrough means, respectively;

which method comprises the steps of determining the dimensions of the arc tube of the discharge vessel and the electrode feedthrough means structure using a design space of Claim 17.

21. A method for the design and construction of a discharge lamp having a power range of about 150W to about 1000W and comprising a ceramic discharge vessel enclosing a discharge space, said discharge vessel including within said discharge space an ionizable material comprising a metal halide mixture, a first and second discharge electrode feedthrough means, and a first and second current conductor connected to said first and second

discharge electrode feedthrough means, respectively;

which method comprises the steps of determining the dimensions of the arc tube of the discharge vessel and the electrode feedthrough means structure using a design space of Claim 18.

22. A method for the design and construction of a discharge lamp having a power range of about 150W to about 1000W and comprising a ceramic discharge vessel enclosing a discharge space, said discharge vessel including within said discharge space an ionizable material comprising a metal halide, a first and second discharge electrode feedthrough means, and a first and second current conductor connected to said first and second discharge electrode feedthrough means, respectively;

which method comprises the steps of determining the dimensions of the arc tube of the discharge vessel and the electrode feedthrough means structure using a design space of Claim 19.

23. A method as claimed in Claim 22, including the further design parameter that the metal halide comprises the following salts of 6-25 wt% NaI, 5-6 wt% TlI, 34-37 wt% CaI_2, 11-18 wt% DyI_3, 11-18 wt% HoI_3, and 11-18 wt% TmI_3.

24. A method as claimed in Claim 23, including the further design parameter that the ionizable filling is a mixture of about 99.99% of Xenon and a trace amount of ^{85}Kr radioactive gas.

25. A method as claimed in Claim 24, including the further design parameter that the discharge vessel has a ceramic wall and is

closed by a ceramic plug, said electrode feedthrough means including at least one tungsten electrode which is connected to a niobium electric current conductor by means of a leadthrough element which projects into the ceramic plug with a tight fit, is connected thereto in a gas-tight manner by means of a sealing ceramic and has a part formed from aluminum oxide and molybdenum which forms a cermet at the area of the gas-tight connection.

26. A method as claimed in Claim 24, including the further design parameter that the discharge vessel has a ceramic wall and is closed by a ceramic plug, said electrode feedthrough means including at least one tungsten electrode which is connected to a niobium electric current conductor by means of a leadthrough element which projects into the ceramic plug with a tight fit, is connected thereto in a gas-tight manner by means of a sealing ceramic and has a first part formed from aluminum oxide and molybdenum which forms a cermet at the area of the gas-tight connection and a second part which is a metal part and extends from the cermet in the direction of the electrode.

27. A method as claimed in Claim 26, wherein the metal part is a molybdenum rod.

28. A method as claimed in Claims 25 and 26, wherein the

electrode has a tip extension in the range of about 0.2 to about 1.0mm; the cermet contains at least about 35 wt.% Mo with the remainder being Al_2O_3, and the sealing ceramic flow completely covers the Nb connector.

29. A method as claimed in Claim 20 wherein the lamp produced has a power range of about 150W to about 1000W and nominal voltage of 100V to 260V, and one or more of the following characteristics: a lumen maintenance of >80%, a color temperature shift <200K from 100 to 8,000 hours, and lifetime of about 10,000 to about 25,000 hours.